JOURNAL OF CELLULAR PHYSIOLOGY

A WISTAR INSTITUTE PRESS JOURNAL PUBLISHED BY ALAN R. LISS, INC.

VITTORIO DEFENDI, Editor-in-Chief
New York University Medical Center • Department of Pathology
550 First Avenue • New York, New York 10016

EDITORS

RENATO BASERGA Temple University

PHILIP I. MARCUS University of Connecticut E.A. McCULLOCH University of Toronto P. SIEKEVITZ
The Rockefeller University

JOHN W. ADAMSON

Veterans Administration Hospital, Seattle

GUENTER ALBRECHT-BUEHLER Cold Spring Harbor, New York

CLAUDIO BASILICO
New York University

LAWRENCE A. CHASIN Columbia University

DENNIS D. CUNNINGHAM University of California Irvine

KURT HIRSCHHORN Mount Sinai School of Medicine

HERMAN M. KALCKAR Boston University ASSOCIATE EDITORS

RUDOLF JAENISCH
Heinrich-Pette-Institute für
Experimentelle Virologie
ünd Immunologie an der
Universität Hamburg,
Federal Republic of
Germany

I. LIEBERMAN
University of Pittsburgh

D. MARSLAND (Emeritus) 3523 Loquat Avenue Miami, Florida 33133

GEORGE M. MARTIN
University of Washington
Seattle

D. MAZIA
University of California
Berkeley

M. L. MENDELSOHN
Lawrence Livermore
Laboratory

DONALD METCALF Walter and Eliza Hall Institute, Australia

IRA PASTAN
National Cancer Institute

P.G.W. PLAGEMANN
University of Minnesota

DANIEL RIFKIN
New York University
Medical Center

RUSSELL ROSS

University of Washington Seattle

ASER ROTHSTEIN
The Hospital for Sick
Children
Research Institute
Toronto

GIOVANNI ROVERA
The Wistar Institute

CLIFFORD STANNERS
The Ontario Cancer
Institute

I. BERNARD WEINSTEIN
Columbia University,
College of Physicians and
Surgeons

KENNETH M. YAMADA National Cancer Institute COPYRIGHT © 1982 BY ALAN R. LISS, INC.

All Rights Reserved

Contents

No. 1 JANUARY 1982

Cloned Macrophages by Concanavalin A for Tumoricidal Effect: Assessment of Tumor Cell Cytotoxicity by a Clonogenic Assay
Ann Ager, John L. Gordon, Salvador Moncada, Jeremy D. Pearson, John A. Salmon, and Michael A. Trevethick. Effects of Isolation and Culture on Prostaglandin Synthesis by Porcine Aortic Endothelial and Smooth Muscle Cells
J. Epstein. SV ₄₀ -Transformed Human Cells Fail To Grow in Zinc Concentrations Which Permit Normal Human Fibroblast Proliferation
R. Weinstein, G.A. Hoover, J. Majure, J. van der Spek, M.B. Stemerman, and T. Macaig. Growth of Human Foreskin Fibroblasts in a Serum-Free, Defined Medium Without Platelet-Derived Growth Factor
JOSEPH T. TUPPER, WILLIAM T. RYALS, AND PETER V. BODINE. Membrane Transport Properties Differ Following Return of Serum-Deprived Versus Ca ⁺⁺ -Deprived Human Fibroblasts to a Proliferative State
CORRINE M. GAJDUSEK AND STEPHEN M. SCHWARTZ. Ability of Endothelial Cells To Condition Culture Medium
Tetsuro Okabe, Hitoshi Nomura, Noriharu Sato, and Nakaaki Ohsawa. Large-Scale Preparation and Characterization of Human Colony-Stimulating Factor
Lana S. Rittmann, Carole L. Jelsema, Edward L. Schwartz, Asterios S. Tsiftsoglou, and Alan C. Sartorelli. Lipid Composition of Friend Leukemia Cells Following Induction of Erythroid Differentiation by Dimethyl Sulfoxide
Guido David and Merton Bernfield. Defective Basal Lamina Formation by Transformed Mammary Epithelial Cells: A Reduced Effect of Collagen on Basal Lamina (Heparan Sulfate-Rich) Proteoglycan Degradation
THOMAS G. O'BRIEN. Hexose Transport in Undifferentiated and Differentiated BALB/c 3T3 Preadipose Cells: Effects of 12-0-Tetradecanoylphorbol-13-Acetate and Insulin
L. Giguère, J. Cheng, and D. Gospodarowicz. Factors Involved in the Control of Proliferation of Bovine Corneal Endothelial Cells Maintained in Serum-Free Medium 72
R. Jerrold Fulton, Paul L. Kaplan, David A. Hart, and Brad Ozanne. Morphological Transformation of Cells Induced by Kirsten Sarcoma Virus Transforming Factor Is Independent of Serine Proteases
JOHN S. COOK, EMILY H. TATE, AND CAROLYN SHAFFER. Uptake of [3H] Oubain From the Cell Surface Into the Lysosomal Compartment of HeLa Cells
Walker Wharton, G. Yancey Gillespie, Stephen W. Russell, and W. J. Pledger. Mitogenic Activity Elaborated by Macrophage-Like Cell Lines Acts as Competence Factor(s) for BALB/c 3T3 Cells
N. WILLIAMS, R.R. EGER, H.M. JACKSON, AND D.J. NELSON. Two-Factor Requirement for Murine Megakaryocyte Colony Formation
Erratum
DAVID E. AMACHER AND SIMONE C. PAILLET. Trifluorothymidine Resistance and Colony Size in L5178 Y/TK+'-Cells Treated With Methyl Methanesulfonate. 106:349-360, 1981
No. 2 FEBRUARY 1982
HARUHIRO HIGASHIDA, NAOMASA MIKI, TATSUYA TANAKA, KANEFUSA KATO, TAMOTSU NAKANO, TOSHIHARU NAGATSU, AND KYOKO KANO-TANAKA. Receptor-Associated Changes of the Catecholamine-Sensitive Adenylate Cyclase in Glioma Cells Doubly Transformed With Moloney Sarcoma Virus

Brian F. Cheetham and Alan J.D. Bellett. A Biochemical Investigation of the Adenovirus-Induced G1 to S Phase Progression: Thymidine Kinase, Ornithine Decarboxylase, and Inhibitors of Polyamine Biosynthesis
CHARLES B. UNDERHILL AND BRYAN P. Toole. Transformation-Dependent Loss of the Hyaluronate-Containing Coats of Cultured Cells
N. Savion, I. Vlodavsky, G. Greenburg, and D. Gospodarowicz. Synthesis and Distribution of Cytoskeletal Elements in Endothelial Cells as a Function of Cell Growth and Organization
Wallace L. McKeehan and Kerstin A. McKeehan. Changes in NAD(P) ⁺ -Dependent Malic Enzyme and Malate Dehydrogenase Activities During Fibroblast Proliferation
JESSE W. BOWEN AND CHARLES LEVINSON. Phosphate Concentration and Transport in Ehrlich Ascites Tumor Cells: Effect of Sodium
Jeffrey M. Harmon and E. Brad Thompson. Glutamine Synthetase Induction by Glucocorticoids in the Glucocorticoid-Sensitive Human Leukemic Cell Line CEM-C7.
CHRISTA M. STOSCHEK, BRADLEY G. ERWIN, JAMES R. FLORINI, ROBERT A. RICHMAN, AND ANTHONY E. PEGG. Effects of Inhibitors of Ornithine and S-Adenosylmethionine Decarboxylases on L6 Myoblast Proliferation
Jacqueline A. Proper, Chris L. Bjornson, and Harold L. Moses. Mouse Embryos Contain Polypeptide Growth Factor(s) Capable of Inducing a Reversible Neo- plastic Phenotype in Nontransformed Cells in Culture
J.M. Ryan, P.J. Nielsen, and L.R. Nelson. The Effects of Division Rate-Limiting Amounts of Fetal Bovine Serum on the Proliferation and Aging of Cultured Chick Cells
JIN-SHYUN RUTH WU AND LEE F. JOHNSON. Regulation of Dihydrofolate Reductase Gene Transcription in Methotrexate-Resistant Mouse Fibroblasts
BARRY W. FESTOFF, MICHAEL R. PATTERSON, AND KARL ROMSTEDT. Plasminogen Activator: The Major Secreted Neutral Protease of Cultured Skeletal Muscle Cells 190
Ugo Testa, William Vainchenker, Angelo Guerrasio, Yves Beuzard, Janine Breton-Gorius, Jean Rosa, A.J. Lusis, and David Golde. Hb Switching in Neonatal Cultures. Increase of HbA Synthesis in Presence of an Erythroid Potentiating Activity (EPA)
LILLY Y.W. BOURGUIGNON AND BRYAN T. BUTMAN. Intracellular Localization of Certain Membrane Glycoproteins in Mouse T-Lymphoma Cells Using Immunoferritin Staining of Ultrathin Frozen Sections
Hiroshi Sakagami, Youji Mitsui, Sei-Itsu Murota, and Masa-Atsu Yamada. Effect of Growth Stage on Histone H1 Metabolism in Human Diploid Fibroblasts
Mary C. Tsao, Ben J. Walthall, and Richard G. Ham. Clonal Growth of Normal Human Epidermal Keratinocytes in a Defined Medium
Erratum
Peter J. Hornsby and Gordon N. Gill. Regulation of Glutamine and Pyruvate Oxidation in Cultured Adrenocortical Cells by Cortisol, Antioxidants, and Oxygen: Effects on Cell Proliferation 109:111-120, 1981
No. 3 MARCH 1982
Anton M. Jetten. Effects of Retinoic Acid on the Binding and Mitogenic Activity of Epidermal Growth Factor
JUNKO MORI, HIROSHI ASHIDA, EIICHI MARU, AND JIRO TATSUNO. Effects of Ca Ions on Action Potentials in Immature Cultured Neurons From Chick Cerebral Cortex
Bonnie M. Phelps, Patrick Williamson, and Robert A. Schlegel. Lectin-Induced Rearrangement of an Immature Hematopoietic Cell Surface Marker
F.J. Ballard, M.K. Nield, G.L. Francis, G.W. Dahlenburg, and J.C. Wallace. The Relationship Between the Insulin Content and Inhibitory Effects of Bovine Colostrum on Protein Breakdown in Cultured Cells

James M. Phang, Sylvia J. Downing, Grace Chao Yeh, Robert J. Smith, Jeffery A. Williams, and Curt H. Hagedorn. Stimulation of the Hexosemonophosphate-Pentose Pathway by Pyrroline-5-Carboxylate in Cultured Cells.	255
Anne Smith-Kielland, Gunnar Bengtsson, Lene Svendsen, and Jorg Morland. Protein Synthesis in Different Populations of Rat Hepatocytes Separated According to Density	262
Atsuyuki Okuda and Genki Kimura. Effects of Serum Deprivation on the Initiation of DNA Synthesis in the Second Generation in Rat 3Y1 Cells	267
D.L. Cronkite and M. Burg. Ion Regulation in Potassium-Sensitive Mutants of Paramecium tetraurelia	271
WILLIAM S. WALKER AND SHING-ERH YEN. Complement Receptor Phenotypes of Culture-Derived Murine Macrophages	277
Kuang Yu Chen, Vincent Presepe, Nancy Parken, and Alice YC. Liu. Changes of Ornithine Decarboxylase Activity and Polyamine Content Upon Differentiation of Mouse NB-15 Neuroblastoma Cells	285
WILLIAM NEGENDANK AND CALVIN SHALLER. The Effect of Metabolic Inhibition on Ion Contents and Sodium Exchange in Human Lymphocytes	291
CHARLES A. WEBER AND ROLF F. KLETZIEN. Hormonal and Nutritional Factors Influencing Glycogen Deposition in Primary Cultures of Rat Liver Parenchymal Cells	300
ROLF F. KLETZIEN, CHARLES A. WEBER, FRED R. BUTCHER, AND DEBORAH J. STUMPO. Glucagon and Choleragen Stimulation of Glycogenolysis in Primary Cultures of Adult Rat Liver Parenchymal Cells: Lack of Involvement of the Glucocorticoids	304
W. Edward Mercer and Robert A. Schlegel. Cytoplasts Can Transfer Factor(s) That Stimulate Quiescent Fibroblasts to Enter S Phase	311
Shohei Miyata and Hirozi K. Kihara. Selective Inhibition of DNA Synthesis by a Protein Released From Spleen Cells	315
ELIEZER RAPAPORT, EDWARD W. SCHRODER, AND PAUL H. BLACK. Retinoic Acid-Promoted Expansion of Total Cellular ATP Pools in 3T3 Cells Can Mediate Its Stimulatory and Growth Inhibitory Effects	318
$eq:theodore P. Ciaraldi and Jerrold M. Olefsky. Comparison of the Effects of Insulin and H_2O_2 on Adipocyte Glucose Transport$	323
Donald A. Sens, Bruce Hochstadt, and Harold Amos. Effects of Pyruvate on the Growth of Normal and Transformed Hamster Embryo Fibroblasts	329
Errata	
Samuel A. Burstein, John W. Adamson, Susan K. Erb, and Lawrence A. Harker. Megakaryocytopoiesis in the Mouse: Response to Varying Platelet Demand. 109: 333-341 (1981)	337
$\rlap/O.W.R\rlap/onning, T.Lindmo, E.O.Pettersen, and P.O.Seglen.TheRoleofProteinAccumulationintheCellCycleControlofHumanNHIK3025Cells.109:411-418(1981)$	339
Index to Volume 110	341

THE ORIGINS OF LIFE AND EVOLUTION

MBL Lectures in Biology, Volume 1

The study of the origins of life is obviously complicated by the lack of hard scientific data. However, recent advances in geology, paleobiology, molecular and cellular biology, and space exploration dictate a re-evaluation of widely held beliefs about life's origins and justify the proposal of some radical new theories.

For example, Oparin's classic proposal that life began in the oceans has been accepted without question by generations of scientists and laymen. However, some contributors to The Origins of Life and Evolution suggest that this theory contradicts current thinking about thermodynamics and biochemistry. One contributor suggests that the crucial transformation of inorganic precursor chemicals into self-replicating organisms is more likely to have occurred in water droplets suspended in the hot primeval atmosphere than in the sea.

Other contributors to this volume offer new perspectives on topics such as:

- morphological and organic geochemical studies of ancient rock deposits
- experimental reconstruction and testing of hypotheses about the synthesis of organic molecules from inorganic ones
- presence of organic and pre-organic compounds in interstellar space
- evolutionary relationships between prokaryotes and eukaryotes
- influence of early life on the climate and geology of the primeval earth
- phylogenetic characterization of ancient microorganisms

The papers in The Origins of Life and Evolution cover a wide spectrum of scientific inquiry, and will be of interest to biologists, biochemists, biophysicists, geologists, biogeologists, organic geochemists and cosmochemists, ecologists, and all other scientists concerned with the origins and evolution of life.

CONTENTS

Foreword, Paul R. Gross

Microspheres From the Swartkoppie Formation: A Review, Paul K. Strother and Elso S. Barghoorn

The Organic Geochemical Record in Ancient Sediments and the Early Evolution of Life — A Short Summary, **David J. Des Marais**

The Origin of Life: A Thermodynamic Critique, K.E. Van Holde

Prebiological Synthesis of Organic Molecules and the Origin of Life, **J. Oró**

An Alternative to the Oparin View of the Primeval Sequence, Carl R. Woese

The Limits of Genetic Diversity, K.C. Atwood

Phyla for Bacteria, Lynn Margulis

Phylogenetic Analysis of Photosynthetic Bacteria Based on Comparison of 16S Ribosomal RNA Catalogues, **Jane Gibson**

Recent Observations Bearing on the Evolution and Possible Origin of Mitochondria, **Henry R. Mahler**

MBL Lectures in Biology Volume 1

The Origins of Life and Evolution

Harlyn Ö. Halvorson and K.E. Van Holde, Editors Proceedings of a symposium held at the Marine Biological Laboratory, Woods Hole, Massachusetts, July 1979 Publication: November 1980 LC 80-21901 ISBN 0-8451-2200-2 140 pages, \$16.00

Customers in Europe, the United Kingdom, the Middle East, and East and West Africa may order this title from their regular bookseller or from our exclusive distributor: Heyden & Son, Ltd., Spectrum House, Hillview Gardens, London NW4 2JQ, England or Heyden & Son GmbH, Devesburgstrasse No. 6, 4440-Rheine, West Germany. Orders from these areas should not be sent to the publisher. Price in these areas: (Rheine) DM 48.00 (London) £10.90

Order from your bookseller or directly from the publisher:
Alan R. Liss, Inc.
150 Fifth Avenue

New York, NY 10011